AMENDMENTS TO THE CLAIMS:

Please amend claims 1-4, 12 and 13 as follows.

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. *(Currently Amended)* An impact ionisation avalanche transit time (IMPATT) diode device comprising:

~~a main~~an avalanche region;

a drift region; and

a narrow bandgap region with a bandgap narrower than the bandgap in the ~~main~~ avalanche region which narrow bandgap region ~~(4, 40)~~ is located adjacent to the ~~main~~ avalanche region in order to generate within the narrow bandgap region a tunnel current which is injected into the ~~main~~ avalanche region.

2. *(Currently Amended)* An IMPATT diode according to claim 1 wherein the narrow bandgap region is arranged to generate a tunnel current for injection into the ~~main~~ avalanche region at the peak reverse bias voltage applied to the diode.

3. *(Currently Amended)* An IMPATT diode according to claim 1 wherein the narrow bandgap region is located at the edge of the ~~main~~ avalanche region.

4. *(Currently Amended)* An IMPATT diode according to claim 1, wherein the narrow bandgap region is located between a heavily doped contact region and the ~~main~~ avalanche region.

5. *(Previously Presented)* An IMPATT diode according to claim 1, wherein the narrow bandgap region comprises one layer of narrow bandgap material.

6. *(Previously Presented)* An IMPATT diode according to claim 1, wherein the narrow bandgap region comprises a plurality of layers of narrow bandgap material.

7. *(Previously Presented)* An IMPATT diode according to claim 1, wherein the diode has a lo-hi-lo doping profile.

8. *(Previously Presented)* An IMPATT diode according to claim 7 wherein the diode is a Misawa p-i-n diode.

9. *(Previously Presented)* An IMPATT diode according to claim 1, wherein the diode is a double drift diode.

10. *(Previously Presented)* An IMPATT diode according to claim 1, wherein the diode is made of III-V semiconductor materials.

11. *(Previously Presented)* An IMPATT diode according to claim 1, wherein the diode is made of group IV semiconductor materials.

12. *(Currently Amended)* An IMPATT diode according to claim 11 wherein the narrow bandgap region is made of at least one layer of Silicon Germanium and the ~~main~~ avalanche region is made of Silicon.

13. *(Currently Amended)* An IMPATT diode according to claim 10 wherein the narrow bandgap region is made of at least one layer of Gallium Arsenide and the ~~main~~ avalanche region is made of Aluminium Gallium Arsenide.

14. *(Previously Presented)* An IMPATT diode according to claim 1, wherein the length of the drift region or regions is between 2 and 6 times the length of the avalanche region.

15. *(Previously Presented)* An IMPATT diode according to claim 14 wherein the length of the drift region or regions is between 3.5 and 4.5 times the length of the avalanche region.

16. *(Previously Presented)* An IMPATT diode according to claim 1, arranged such that at least part of the tunnel current can be generated by optical excitation.

17. *(Previously Presented)* A method of operating the IMPATT diode of claim 1, wherein an oscillating voltage across the diode has a period of between 4 and 12 times the transit time of the avalanche region.

18. *(Previously Presented)* A method according to claim 17 wherein the oscillating voltage has a period of between 7.5 and 8.5 times the transit time of the avalanche region.

19. *(Previously Presented)* A method according to claim 17 including the step of optically exiting at least part of the tunnel current.